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Distribution of Phytoplankton in Montana Lakes

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This is a data report presenting the species and abundance of phytoplankton in the 15 lakes sampled by the National Eutrophication Survey in the State of Montana. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

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DISTRIBUTION OF PHYTOPLANKTON IN MONTANA LAKES

by

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FOREWORD

Protection of the environment requires effective regulatory actions which are based on sound technical and scientific information. This information must include the quantitative description and linking of pollutant sources, transport mechanisms, interactions, and resulting effects on man and his environment. Because of the complexities involved, assessment of specific pollutants in the environment requires a total systems approach which transcends the media of air, water, and land. The Environmental Monitoring and Support Laboratory-Las Vegas contributes to the formation and enhancement of a sound monitoring data base for exposure assessment through programs designed to:

- develop and optimize systems and strategies for monitoring pollutants and their impact on the environment
- demonstrate new monitoring systems and technologies by applying them to fulfill special monitoring needs of the Agency's operating programs

This report presents the species and abundance of phytoplankton in the 15 lakes sampled by the National Eutrophication Survey in the State of Montana, along with results from the calculation of several commonly used biological indices of water quality and community structure. These data can be used to biologically characterize the study lakes, and as baseline data for future investigations. This report was written for use by Federal, State, and local governmental agencies concerned with water quality analysis, monitoring, and/or regulation. Private industry and individuals similarly involved with the biological aspects of water quality will find the document useful. For further information contact the Water and Land Quality Branch, Monitoring Operations Division.

George B. Morgan
Director
Environmental Monitoring and Support Laboratory
Las Vegas

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INTRODUCTION

The collection and analysis of phytoplankton data were included in the National Eutrophication Survey in an effort to determine relationships between algal characteristics and trophic status of individual lakes.

During spring, summer, and fall of 1975, the Survey sampled 156 lakes in 11 States. Over 450 algal species and varieties were identified and enumerated from the 430 water samples examined.

This report presents the species and abundance of phytoplankton in the 15 lakes sampled in the State of Montana (Table 1). The Nygaard's Trophic State (Nygaard 1949), Palmer's Organic Pollution (Palmer 1969), and species diversity and abundance indices are also included.

TABLE 1. LAKES SAMPLED IN THE STATE OF MONTANA

STORET No.	Lake Name	County
3001	Canyon Ferry Reservoir	Lewis & Clark, Broadwater
3002	Clark Canyon Reservoir	Beaverhead
3003	Flathead Lake	Flathead, Lake
3004	Georgetown Reservoir	Granite, Deer Lodge
3005	Hebgen Reservoir	Gallatin
3006	Koocanusa Reservoir	Lincoln
3007	Mary Ronan Lake	Lake
3008	McDonald Lake	Flathead
3009	Nelson Reservoir	Phillips
3010	Seeley Lake	Missoula
3011	Swan Lake	Flathead
3012	Tally Lake	Flathead

(Continued)

TABLE 1. LAKES SAMPLED IN THE STATE OF MONTANA

STORET No.	Lake Name	County
3013	Tiber Reservoir	Toole, Liberty
3014	Tongue River Reservoir	Big Horn
3016	Whitefish Lake (lower)	Flathead

MATERIALS AND METHODS

LAKE AND SITE SELECTION

Lakes and reservoirs included in the Survey were selected through discussions with State water pollution agency personnel and U.S. Environmental Protection Agency Regional Offices (U.S. Environmental Protection Agency 1975). Screening and selection strongly emphasized lakes with actual or potential accelerated eutrophication problems. As a result, the selection was limited to lakes:

(1) impacted by one or more municipal sewage treatment plant outfalls either directly into the lake or by discharge to an inlet tributary within approximately 40 kilometers of the lake;

(2) 40 hectares or larger in size; and

(3) with a mean hydraulic retention time of at least 30 days.

Specific selection criteria were waived for some lakes of particular State interest.

Sampling sites for a lake were selected based on available information on lake morphometry, potential major sources of nutrient input, and on-site judgment of the field limnologist (U.S. Environmental Protection Agency 1975). Primary sampling sites were chosen to reflect the deepest portion of each major basin in a test lake. Where many basins were present, selection was guided by nutrient source information on hand. At each sampling site, a depth-integrated phytoplankton sample was taken. Depth-integrated samples were uniform mixtures of water from the surface to a depth of 15 feet (4.6 meters) or from the surface to the lower limit of the photic zone representing 1 percent of the incident light, whichever was greater. If the depth at the sampling site was less than 15 feet (4.6 meters), the sample was taken from just off the bottom to the surface. Normally, a lake was sampled three times in 1 year, providing information on spring, summer, and fall conditions.

SAMPLE PREPARATION

To preserve the sample 4 milliliters (ml) of Acid-Lugol's solution (Prescott 1970) were added to each 130-ml sample from each site at the time of collection. The samples were shipped to the Environmental Monitoring and Support Laboratory, Las Vegas, Nevada, where equal volumes from each site

were mixed to form two 130-ml composite samples for a given lake. One composite sample was put into storage and the other was used for the examination.

Prior to examination, the composite samples were concentrated by the settling method. Solids were allowed to settle for at least 24 hours prior to siphoning off the supernate. The volume of the removed supernate and the volume of the remaining concentrate were measured and concentrations determined. A small (8-ml) library subsample of the concentrate was then taken. The remaining concentrate was gently agitated to resuspend the plankton and poured into a capped, graduated test tube. If a preliminary examination of a sample indicated the need for a more concentrated sample, the contents of the test tube were further concentrated by repeating the settling method. Final concentrations varied from 15 to 40 times the original.

Permanent slides were prepared from concentrated samples after analysis was complete. A ring of clear Karo® corn syrup with phenol (a few crystals of phenol were added to each 100 ml of syrup) was placed on a glass slide. A drop of superconcentrate from the bottom of the test tube was placed in the ring. This solution was thoroughly mixed and topped with a coverglass. After the syrup at the edges of the coverglass had hardened, the excess was scraped away and the mount was sealed with clear fingernail polish. Permanent diatom slides were prepared by drying sample material on a coverglass, heating in a muffle furnace at 400° C for 45 minutes, and mounting in Hyrax®. Finally, the mounts were sealed with clear fingernail polish.

Backup samples, library samples, permanent sample slides, and Hyrax®-mounted diatom slides are being stored and maintained at the Environmental Monitoring and Support Laboratory-Las Vegas.

EXAMINATION

The phytoplankton samples were examined with the aid of binocular compound microscopes. A preliminary examination was performed to precisely identify and list all forms encountered. The length of this examination varied depending on the complexity of the sample. An attempt was made to find and identify all of the forms present in each sample. Often forms were observed which could not be identified to species or to genus. Abbreviated descriptions were used to keep a record of these forms (e.g., lunate cell, blue-green filament, Navicula #1). Diatom slides were examined using a standard light microscope. If greater resolution was essential to accurately identify the diatoms, a phase-contrast microscope was used.

After the species list was compiled, phytoplankton were enumerated using a Neubauer Counting Chamber with a 40X objective lens and a 10X ocular lens. All forms within each field were counted. The count was continued until a minimum of 100 fields had been viewed, or until the dominant form had been observed a minimum of 100 times.

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QUALITY CONTROL

Project phycologists performed internal quality control intercomparisons regularly on 7 percent of the species identification and counts. Although an individual had primary responsibility for analyzing a sample, taxonomic problems were discussed among the phycologists.

Additional quality control checks were performed on the Survey samples by Dr. G. W. Prescott of the University of Montana at the rate of 5 percent. Quality control checks were made on 75 percent of these samples to verify species identifications while checks were made on the remaining 25 percent of the samples to verify genus counts. Presently, the agreement between quality control checks for species identification and genus enumerations is satisfactory.

RESULTS

A phytoplankton species list for the State is presented in Appendix A. Appendix B summarizes all of the phytoplankton data collected from the State by the Survey. The latter is organized by lake, and includes an alphabetical phytoplankton species list with concentrations for individual species given by sampling date. Results from the application of several indices are presented (Nygaard's Trophic State, Palmer's Organic Pollution, and species diversity and abundance). Each lake has been assigned a four-digit STORET number. (STORET (STOrage and RETrieval) is the U.S. Environmental Protection Agency's computer system which processes and maintains water quality data.) The first two digits of the STORET number identify the State; the last two digits identify the lake.

NYGAARD'S TROPHIC STATE INDICES

Five indices devised by Nygaard (1949) were proposed under the assumption that certain algal groups are indicative of levels of nutrient enrichment. These indices were calculated in order to aid in determining the surveyed lakes' trophic status. As a general rule, Cyanophyta, Euglenophyta, centric diatoms, and members of the Chlorococcales are found in waters that are eutrophic (rich in nutrients), while desmids and many pennate diatoms generally cannot tolerate high nutrient levels and so are found in oligotrophic waters (poor in nutrients).

In applying the indices to the Survey data, the number of taxa in each major group was determined from the species list for each sample. The ratios of these groups give numerical values which can be used as a biological index of water richness. The five indices and the ranges of values established for Danish lakes by Nygaard for each trophic state are presented in Table 2. The appropriate symbol, (E) eutrophic and (O) oligotrophic, follows each calculated value in the tables in Appendix B. A question mark (?) following a calculated value in these tables was entered when that value was within the range of both classifications.

PALMER'S ORGANIC POLLUTION INDICES

Palmer (1969) analyzed reports from 165 authors and developed algal pollution indices for use in rating water samples with high organic pollution. Two lists of organic-pollution-tolerant forms were prepared, one containing 20 genera, the other, 20 species (Tables 3 and 4). Each form was assigned a pollution index number ranging from 1 for moderately tolerant forms to 6 for

TABLE 2. NYGAARD'S TROPHIC STATE INDICES ADAPTED FROM HUTCHINSON (1967)

Index	Calculation	Oligotrophic	Eutrophic
Myxophycean	Myxophyceae / Desmideae	0.0-0.4	0.1-3.0
Chlorophycean	Chlorococcales / Desmideae	0.0-0.7	0.2-9.0
Diatom	Centric Diatoms / Pennate Diatoms	0.0-0.3	0.0-1.75
Euglenophyte	Euglenophyta / Myxophyceae + Chlorococcales	0.0-0.2	0.0-1.0
Compound	Myxophyceae + Chlorococcales + Centric Diatoms + Euglenophyta / Desmideae	0.0-1.0	1.2-25

TABLE 3. ALGAL GENUS POLLUTION INDEX (Palmer 1969)

Genus	Pollution Index
Anacystis	1
Ankistrodesmus	2
Chlamydomonas	4
Chlorella	3
Closterium	1
Cyclotella	1
Euglena	5
Gomphonema	1
Lepocinclis	1
Melosira	1
Micractinium	1
Navicula	3
Nitzschia	3
Oscillatoria	5
Pandorina	1
Phacus	2
Phormidium	1
Scenedesmus	4
Stigeoclonium	2
Synedra	2

TABLE 4. ALGAL SPECIES POLLUTION INDEX (Palmer 1969)

Species	Pollution Index
Ankistrodesmus falcatus	3
Arthrospira jenneri	2
Chlorella vulgaris	2
Cyclotella meneghiniana	2
Euglena gracilis	1
Euglena viridis	6
Gomphonema parvulum	1
Melosira varians	2
Navicula cryptocephala	1
Nitzschia acicularis	1
Nitzschia palea	5
Oscillatoria chlorina	2
Oscillatoria limosa	4
Oscillatoria princeps	1
Oscillatoria putrida	1
Oscillatoria tenuis	4
Pandorina morum	3
Scenedesmus quadricauda	4
Stigeoclonium tenue	3
Synedra ulna	3

extremely tolerant forms. Palmer based the index numbers on occurrence records and/or where emphasized by the authors as being especially tolerant of organic pollution.

In analyzing a water sample, any of the 20 genera or species of algae present in concentrations of 50 per milliliter or more are recorded. The pollution index numbers of the algae present are totaled, providing a genus score and a species score. Palmer determined that a score of 20 or more for either index can be taken as evidence of high organic pollution, while a score of 15 to 19 is taken as probable evidence of high organic pollution. Lower figures suggest that the organic pollution of the sample is not high, that the sample is not representative, or that some substance or factor interfering with algal persistence is present and active.

SPECIES DIVERSITY AND ABUNDANCE INDICES

"Information content" of biological samples is being used commonly by biologists as a measure of diversity. Diversity in this connection means the degree of uncertainty attached to the specific identity of any randomly selected individual. The greater the number of taxa and the more equal their proportions, the greater the uncertainty, and hence, the diversity (Pielou 1966). There are several methods of measuring diversity, e.g., the formulas given by Brillouin (1962) and Shannon and Weaver (1963). The method which is appropriate depends on the type of biological sample on hand.

Pielou (1966) classifies the types of biological samples and gives the measure of diversity appropriate for each type. The Survey phytoplankton samples are what she classifies as larger samples (collections in Pielou's terminology) from which random subsamples can be drawn. According to Pielou, the average diversity per individual (H) for these types of samples can be estimated from the Shannon-Wiener formula (Shannon and Weaver 1963):

$$H = -\sum_{i=1}^{S} P_i \log_x P_i$$

where P is the proportion of the ith taxon in the sample, which is calculated from n_i/N; n_i is the number of individuals per milliliter of the ith taxon; N is the total number of individuals per ml; and S is the total number of taxa. However, Basharin (1959) and Pielou (1966) have pointed out that H calculated from the subsample is a biased estimator of the sample H, and if this bias is to be accounted for, we must know the total number of taxa present in the sample since the magnitude of this bias depends on it.

Pielou (1966) suggests that if the number of taxa in the subsample falls only slightly short of the number in the larger sample, no appreciable error will result in considering S, estimated from the subsample, as being equal to the sample value. Even though considerable effort was made to find and identify all taxa, the Survey samples undoubtedly contain a fair number of rare phytoplankton taxa which were not encountered.

In the Shannon-Wiener formula, an increase in the number of taxa and/or an increase in the evenness of the distribution of individuals among taxa will increase the average diversity per individual from its minimal value of zero. Sager and Hasler (1969) found that the richness of taxa was of minor importance in determination of average diversity per individual for phytoplankton and they concluded that phytoplankton taxa in excess of the 10 to 15 most abundant ones have little effect on H. This was verified by our own calculations. Our counts are in number per milliliter and since logarithms to the base 2 were used in our calculations, H is expressed in units of bits per individual. When individuals of a taxon were so rare that they were not counted, a value of 1/130 per milliliter or 0.008 per milliliter was used in the calculations since at least one individual of the taxon must have been present in the collection.

A Survey sample for a given lake represents a composite of all phytoplankton collected at different sampling sites on the lake during a given sampling period. Since the number of samples (M) making up a composite is a function of both the complexity of the lake sampled and its size, it should affect the richness-of-taxa component of the diversity of our phytoplankton collections. The maximum diversity (MaxH) (i.e., when the individuals are distributed among the taxa as evenly as possible) was estimated from $\log_2 S$ (Pielou 1966), while the minimum diversity (MinH), was estimated from the formula:

$$MinH = -\frac{S-1}{N} \log_2 \frac{1}{N} - \frac{N-(S-1)}{N} \log_2 \frac{N-(S-1)}{N}$$

given by Zand (1976). The total diversity (D) was calculated from HN (Pielou 1966). Also given in Appendix B are L (the mean number of individuals per taxa per milliliter) and K (the number of individuals per milliliter of the most abundant taxon in the sample).

The evenness component of diversity (J) was estimated from H/MaxH (Pielou 1966). Relative evenness (RJ) was calculated from the formula:

$$RJ = \frac{H-MinH}{MaxH-MinH}$$

given by Zand (1976). Zand suggests that RJ be used as a substitute for both J and the redundancy expression given by Wilhm and Dorris (1968). As pointed out by Zand, the redundancy expression given by Wilhm and Dorris does not properly express what it is intended to show, i.e., the position of H in the range between MaxH and MinH. RJ may range from 0 to 1; being 1 for the most even samples and 0 for the least even samples.

Zand (1976) suggests that diversity indices be expressed in units of "sits", i.e., in logarithms to base S (where S is the total number of taxa in the sample) instead of in "bits", i.e., in logarithms to base 2. Zand points out that the diversity index in sits per individual is a normalized number ranging from 1 for the most evenly distributed samples to 0 for the least evenly distributed samples. Also, it can be used to compare different samples, independent of the number of taxa in each. The diversity in bits per

individual should not be used in direct comparisons involving various samples which have different numbers of taxa. Since MaxH equals log S, the expression in sits is equal to $\log_S S$, or 1. Therefore diversity in sits per individual is numerically equivalent to J, the evenness component for the Shannon-Wiener formula.

SPECIES OCCURRENCE AND ABUNDANCE

The alphabetic phytoplankton species list for each lake, presented in Appendix B, gives the concentrations of individual species by sampling date. Concentrations are in cells, colonies, or filaments (CEL, COL, FIL) per milliliter. An "X" after a species name indicates that the species identified in the preliminary examination was in such a low concentration that it did not appear in the count. A blank space indicates that the organism was not found in the sample collected on that date. Column S is used to designate the examiner's subjective opinion of the five dominant taxa in a sample, based upon relative size and concentration of the organism. The percent column (%C) presents, by abundance, the percentage composition of each taxon.

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APPENDIX A

PHYTOPLANKTON SPECIES LIST FOR THE STATE OF MONTANA

Achnanthes flexella
Achnanthes lanceolata
v. *dubia*
Achnanthes lanceolata
v. *rostrata*
Achnanthes microcephala
Actinastrum gracilimum
Amphipleura pellucida
Anabaena flos-aquae
Anabaena planctonica
Ankistrodesmus falcatus
Ankistrodesmus falcatus
v. *acicularis*
Aphanizomenon flos-aquae
Aphanothece
Asterionella formosa
Asterionella formosa
v. *gracillima*
Botryococcus braunii
Caloneis amphisbaena
Campylodiscus noricus
v. *hibernica*
Ceratium hirundinella
Ceratium hirundinella
f. *furcoides*
Ceratium hirundinella
f. *scotticum*
Chlorella
Chroococcus limneticus
Closterium
Cocconeis pediculus
Cocconeis placentula
v. *lineata*
Coelastrum microporum
Coelastrum sphaericum
Coelosphaerium kuetzingianum
Coelosphaerium naegelianum
Cosmarium
Crucigenia rectangularis
Cryptomonas erosa
Cryptomonas erosa
v. *reflexa*
Cryptomonas marssonii
Cryptomonas reflexa
Cyclotella bodanica
Cyclotella comta
Cyclotella kutzingiana
Cyclotella ocellata
Cymatopleura elliptica
Cymatopleura solea
Cymatopleura solea
v. *apiculata*
Cymbella cistula
Cymbella cymbiformis
v. *nonpunctata*
Cymbella minuta
f. *latens*
Cymbella minuta
v. *silesiaca*
Cymbella prostrata
Cymbella triangulum
Dactylococcopsis
Diatoma vulgare
Dictyosphaerium pulchellum
Dinobryon bavaricum
Dinobryon cylindricum
Dinobryon divergens
Dinobryon sociale
Dinobryon sociale
v. *americanum*
Diploneis finnica
Elakatothrix
Epithemia sorex
Epithemia turgida
Eudorina elegans
Euglena
Eunotia valida
Fragilaria construens
Fragilaria crotonensis
Fragilaria leptostauron
Glenodinium edax
Glenodinium gymnodinium
v. *biscutelliforme*
Gloeocapsa
Gloecystis
Golenkinia
Gomphonema angustatum
Gomphonema olivaceum
Gomphosphaeria aponina
Gonium sociale
Gymnodinium albulum
Gymnodinium ordinatum
Gyrosigma wormleyi
Hannaea arcus
Hantzschia amphioxys
Lagerheimia
Lyngbya birgei
Mallomonas acaroides
Melosira distans
Melosira granulata

Melosira granulata
v. *angustissima*
Melosira italica
Melosira varians
Meridion circulare
Microcystis aeruginosa
Microcystis incerta
Mougeotia
Navicula cryptocephala
Navicula radiosa
Navicula rhynchocephala
v. *germainii*
Navicula tripunctata
v. *schizonemoides*
Navicula viridula
v. *avenacea*
Neidium iridis
Nitzschia acicularis
Nitzschia dissipata
Nitzschia filiformis
Nitzschia longissima
v. *reversa*
Nitzschia sigmoidea
Nitzschia vermicularis
Oedogonium
Oocystis
Opephora martyi
Oscillatoria limnetica
Oscillatoria limosa
Pandorina morum
Pascherina tetras
Pediastrum boryanum
Pediastrum duplex
Pediastrum duplex
v. *reticulatum*
Peridinium inconspicuum
Peridinium willei
Phormidium
Pinnularia
Quadrigula lacustris
Rhizosolenia eriensis
Rhoicosphenia curvata
Rhopalodia gibba
Scenedesmus acuminatus
Scenedesmus bijuga
Scenedesmus brasiliensis
v. *norvegicus*
Scenedesmus dimorphus
Scenedesmus opoliensis
Scenedesmus quadricauda
Scenedesmus quadricauda
v. *quadrispina*
Schroederia setigera
Sphaerocystis schroeteri
Staurastrum
Stephanodiscus niagarae
Stipitococcus
Surirella biseriata
Surirella ovata
Synedra acus
Synedra cyclopum
Synedra delicatissima
v. *angustissima*
Synedra ulna
Synedra ulna
v. *chaseana*
Synedra ulna
v. *contracta*
Tabellaria fenestrata
Tetraedron caudatum
Tetraedron minimum
Tetraedron minimum
v. *scrobiculatum*
Tetrastrum glabrum
Tetrastrum staurogeniaeforme
Trachelomonas dubia
Trachelomonas girardiana
Trachelomonas volvocina

APPENDIX B. SUMMARY OF PHYTOPLANKTON DATA

This appendix was generated by computer. Because it was only possible to use upper case letters in the printout, all scientific names are printed in upper case and are not italicized.

The alphabetic phytoplankton lists include taxa without species names (e.g., EUNOTIA, EUNOTIA #1, FLAGELLATE, FLAGELLATES, MICROCYSTIS INCERTA ?, CHLOROPHYTAN COCCOID CELLED COLONY). When species determinations were not possible, symbols or descriptive phrases were used to separate taxa for enumeration purposes. Each name on a list, however, represents a unique species different from any other name on the same list, unless otherwise noted, for counting purposes.

Numbers were used to separate unidentified species of the same genus. A generic name listed alone is also a unique species. A question mark (?) is placed immediately after the portion of a name which was assigned with uncertainty. Numbered, questioned, or otherwise designated taxa were established on a lake-by-lake basis; therefore NAVICULA #2 from lake A cannot be compared to NAVICULA #2 from lake B. Pluralized categories (e.g., FLAGELLATES, CENTRIC DIATOMS, SPP.) were used for counting purposes when taxa could not be properly differentiated on the counting chamber.

LAKE NAME: CANYON FERRY RES.
STORET NUMBER: 3001

NYGAARD TROPHIC STATE INDICES

DATE	05 28 75	07 31 75	09 03 75	10 22 75
MYXOPHYCEAN	01/0 E	4.00 E	02/0 E	02/0 E
CHLOROPHYCEAN	02/0 E	1.00 E	0/0 O	02/0 E
EUGLENOPHYTE	0/03 ?	0/05 ?	0/02 ?	0/04 ?
DIATOM	0.11 ?	0.05 ?	0.67 E	0.10 ?
COMPOUND	05/0 E	6.00 E	04/0 E	06/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 28 75	07 31 75	09 03 75	10 22 75
GENUS	08	05	01	04
SPECIES	00	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 28 75	07 31 75	09 03 75	10 22 75
AVERAGE DIVERSITY	H	3.43	1.85	2.37	2.99
NUMBER OF TAXA	S	28.00	29.00	10.00	29.00
NUMBER OF SAMPLES COMPOSITED	N	5.00	5.00	5.00	5.00
MAXIMUM DIVERSITY	MAXH	4.81	4.86	3.32	4.86
MINIMUM DIVERSITY	MINH	0.16	0.08	0.08	0.38
TOTAL DIVERSITY	D	7388.22	9261.10	3135.51	2442.83
TOTAL NUMBER OF INDIVIDUALS/ML	N	2154.00	5006.00	1323.00	817.00
EVENNESS COMPONENT	J	0.71	0.38	0.71	0.62
RELATIVE EVENNESS	RJ	0.71	0.38	0.71	0.59
MEAN NUMBER OF INDIVIDUALS/TAXA	L	76.93	172.62	132.30	28.17
NUMBER/ML OF MOST ABUNDANT TAXON	K	411.00	2433.00	389.00	265.00

LAKE NAME: CANYON FERRY RES, CONTINUED
STORET NUMBER: 3001

TAXA	FORM	05 20 75			07 31 75			09 03 75			10 23 75		
		1S	%C	ALGAL UNITS PER ML	1S	%C	ALGAL UNITS PER ML	1S	%C	ALGAL UNITS PER ML	1S	%C	ALGAL UNITS PER ML
ACHNANTHES LANCEOLATA V. DUBIA	CEL						X						
ANABAENA	FIL						X						
APHANIZOMENON FLOS-AQUAE	FIL				12	34,6	1731		2,9	39	11	32,4	265
ASTERIONELLA FORMOSA	CEL	1	1,6	34	1	1,9	94	1	5,9	78			X
CALONEIS AMPHISBAENA	CEL						X						
CERATIUM HIRUNDINELLA F. SCOTTICUM	CEL						X						
CHROOMONAS ?	CEL	13	19,1	411	1	3,7	187	1	23,5	311	13	17,6	144
COCCONEIS PEDICULUS	CEL	1	1,6	34			X						X
COCCONEIS PLACENTULA V. LINEATA	CEL						X	1	2,9	39	1	2,9	24
COELOSPHAERIUM NAEGELIANUM	COL						X	1	2,9	39			X
COSMARIUM	CEL						X						
CRYPTOMONAS	CEL												X
CRYPTOMONAS EROSA	CEL	1	1,6	34				1	2,9	39	1	2,9	24
CYMATOPLEURA SOLEA	CEL			X									X
CYMBELLA #1	CEL			X			X				1	5,9	48
CYMBELLA #2	CEL			X									X
CYMBELLA MINUTA F. LATENS	CEL						X						
CYMBELLA SPP.	CEL	1	6,4	137									
CYMBELLA TRIANGULUM	CEL												X
DIATOMA VULGARE	CEL	11	9,5	205									X
DINOBRYON CYLINDRICUM	CEL	1	6,4	137									
EPITHEMIA SOREX	CEL			X			X					2,9	24
EUDORINA ELEGANS	COL									X			
FRAGILARIA	CEL	12	12,7	274									
FRAGILARIA CROTONENSIS	CEL			X	11	48,6	2433	12	29,4	389			X
FRAGILARIA LEPTOSTAURON	CEL				1	4,7	234						X
GOMPHONEMA	CEL						X					5,9	48
GOMPHONEMA OLIVACEUM	CEL	1	3,2	69									
GYROSIGMA WORMLEYI	CEL			X			X						
MELOSIRA DISTANS	CEL	14	17,9	376				1	29,4	389			
MELOSIRA GRANULATA	CEL												
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL			X									
MELOSIRA ITALICA	CEL						X				12	14,7	120
MICROCYSTIS AERUGINOSA	COL						X						
NAVICULA	CEL	1	1,6	34									
NAVICULA #1	CEL			X							1	5,9	48
NAVICULA #2	CEL											2,9	24
NAVICULA CRYPTOCEPHALA	CEL						X						
NAVICULA TRIPUNCTATA V. SCHIZONEMOIDES	CEL						X						X
NAVICULA VIRIDULA V. AVENACEA	CEL	1	1,6	34			X					2,9	24
NEIDIUM	CEL												X
NITZSCHIA	CEL						X						
NITZSCHIA #1	CEL				1	3,7	187						
NITZSCHIA #2	CEL	1	11,1	00240			X						X
NITZSCHIA DISSIPATA	CEL						X						
NITZSCHIA SIGMOIDEA	CEL	1	1,6	34									
OOCYSTIS	CEL			X									
PHORMIDIUM	FIL	1	1,6	34									
RHOICOSPHENIA CURVATA	CEL			X									X
SCENEDESMUS	COL						X						X
SCHROEDERIA SETIGERA	CEL			X								2,9	24
STEPHANODISCUS	CEL							1	2,9	39			X
STEPHANODISCUS NIAGARAE	CEL												
SURIRELLA OVATA	CEL	1	3,2	69									
SYNEDRA ULNA V. CONTRACTA	CEL			X	1	2,8	140			X			X
TOTAL				2154			5008			1323			817

LAKE NAME: CLARK CANYON RES.
STORET NUMBER: 3002

NYGAARD TROPHIC STATE INDICES

DATE	05 28 75	07 31 75	09 03 75	10 20 75
MYXOPHYCEAN	0/0 O	02/0 E	01/0 E	02/0 E
CHLOROPHYCEAN	01/0 E	02/0 E	01/0 E	01/0 E
EUGLENOPHYTE	0/01 ?	0/04 ?	0/02 ?	0/03 ?
DIATOM	0/05 ?	0/05 ?	0/0 ?	1.00 E
COMPOUND	01/0 E	04/0 E	02/0 E	05/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 28 75	07 31 75	09 03 75	10 20 75
GENUS	00	00	00	00
SPECIES	00	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 28 75	07 31 75	09 03 75	10 20 75
AVERAGE DIVERSITY	H	2.18	0.99	0.97	1.64
NUMBER OF TAXA	S	9.00	11.00	4.00	9.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00	3.00	3.00
MAXIMUM DIVERSITY	MAXH	3.17	3.46	2.00	3.17
MINIMUM DIVERSITY	MINH	0.16	0.22	0.02	0.13
TOTAL DIVERSITY	D	1140.14	472.23	1972.01	1110.28
TOTAL NUMBER OF INDIVIDUALS/ML	N	523.00	477.00	2033.00	677.00
EVENNESS COMPONENT	J	0.69	0.29	0.49	0.52
RELATIVE EVENNESS	RJ	0.68	0.24	0.48	0.50
MEAN NUMBER OF INDIVIDUALS/TAXA	L	58.11	43.36	508.25	75.22
NUMBER/ML OF MOST ABUNDANT TAXON	K	175.00	371.00	1634.00	327.00

LAKE NAME: CLARK CANYON RES, CONTINUED
STORET NUMBER: 3002

TAXA	FORM	05 28 75			07 31 75			09 03 75			10 20 75		
		1B	%C	ALGAL UNITS PER ML	1B	%C	ALGAL UNITS PER ML	1B	%C	ALGAL UNITS PER ML	1B	%C	ALGAL UNITS PER ML
ANABAENA	FIL				1	11,1	53						
APHANIZOMENON FLOS-AQUAE	FIL							1	80,4	1634	1	48,3	327
ASTERIONELLA FORMOSA	CEL			X									
CHROOMONAS ?	CEL	2	33,9	175	1	11,1	53	1	10,7	218	1	31,0	210
COELOSPHAERIUM NAEGELIANUM	COL												X
CRYPTOMONAS EROSA	CEL						X						
CRYPTOMONAS MARSSONII	CEL	1	27,7	145				2	7,1	145	2	17,3	117
CYANOPHYTAN FILAMENT	FIL						X						
CYMATOPLEURA SOLEA	CEL												X
CYMBELLA	CEL												X
DIATOMA VULGARE	CEL						X						
EUNOTIA	CEL						X						
EUNOTIA VALIDA	CEL	1	16,6	87									
FLAGELLATE	CEL			X									
FRAGILARIA #1	CEL						X						
FRAGILARIA #2	CEL						X						
FRAGILARIA #3	CEL			X									
GOMPHONEMA	CEL						X						
NAVICULA AMPHIOXYS	CEL	5	11,1	58									
MELOSIRA VARIANS	CEL												X
NITISCHIA	CEL			X									
OOCYSTIS	CEL						X						
SCHROEDERIA SETIGERA	CEL	4	11,1	58	2	77,8	371	4	1,8	36	4	3,4	23
STEPHANODISCUS	CEL												X
TOTAL				523			477			2033			677

LAKE NAME: FLATHEAD LAKE
STORET NUMBER: 3003

NYGAARD TROPHIC STATE INDICES

DATE	05 29 75	07 25 75	09 08 75
MYXOPHYCEAN	1,00 E	01/0 E	1,00 E
CHLOROPHYCEAN	0/01 O	03/0 E	2,00 E
EUGLENOPHYTE	0/01 ?	0/04 ?	0,33 E
DIATOM	0,12 ?	0,75 E	0,25 ?
COMPOUND	2,00 E	07/0 E	5,00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 29 75	07 25 75	09 08 75
GENUS	00	00	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 29 75	07 25 75	09 08 75
AVERAGE DIVERSITY	H	2,00	2,15	1,60
NUMBER OF TAXA	S	19,00	20,00	14,00
NUMBER OF SAMPLES COMPOSITED	M	10,00	10,00	10,00
MAXIMUM DIVERSITY	MAXH	4,25	4,32	3,81
MINIMUM DIVERSITY	MINH	1,01	0,36	0,95
TOTAL DIVERSITY	D	308,00	1197,55	177,60
TOTAL NUMBER OF INDIVIDUALS/ML	N	154,00	557,00	111,00
EVENNESS COMPONENT	J	0,47	0,50	0,42
RELATIVE EVENNESS	RJ	0,31	0,46	0,23
MEAN NUMBER OF INDIVIDUALS/TAXA	L	8,11	27,85	7,93
NUMBER/ML OF MOST ABUNDANT TAXON	K	67,00	257,00	37,00

LAKE NAME: FLATHEAD LAKE CONTINUED
STORET NUMBER: 3003

TAXA	FORM	08 29 76			07 28 76			09 08 76		
		1B	%C	ALGAL UNITS PER ML	1B	%C	ALGAL UNITS PER ML	1B	%C	ALGAL UNITS PER ML
ANABAENA	FIL						X			
ASTERIONELLA FORMOSA	CEL	11	43.8	67	14	7.7	43			X
BOTRYOCOCCUS BRAUNII	COL									X
CENTRIC DIATOM	CEL				13	33.0	138	11	33.3	37
CHLOROPHYTAN COCCOID CELLED COLONY	COL						X			
CHROOCOCCUS LIMNETICUS	COL									X
CHROOMONAS ?	CEL	1B	6.8	10			X	12	33.3	37
CLOSTERIUM	CEL			X						
COSMARIUM	CEL									X
CRYPTOMONAS	CEL									X
CRYPTOMONAS EROSA	CEL	14	6.8	10			X			
CYMATOPLEURA ELLIPTICA	CEL			X						
CYMBELLA	CEL			X			X			
CYMBELLA CYMBIFORMIS V. NONPUNCTATA	CEL			X						
DINOBRYON BAVARICUM	CEL			X			X			
DINOBRYON CYLINDRICUM	CEL			X		7.7	43			
DINOBRYON DIVERGENS	CEL	13	10.0	20	11	46.1	357			
DINOBRYON SOCIALE	CEL						X			
EUDORINA ELEGANS	COL			X						
FRAGILARIA CROTONENSIS	CEL			X			X			
GLOEOCYSTIS	COL									X
GYMNODINIUM	CEL			X						
GYROSIGMA ?	CEL			X						
HALLOMONAS ACARDINES	CEL			X			X			X
HALLOMONAS PSEUDOCORONATA ?	CEL						X			
MELOSIRA ITALICA	CEL			X			X			
NAVICULA	CEL									X
NITZSCHIA	CEL							13	33.3	37
OOCYSTIS	COL				1B	7.7	43			
OSCILLATORIA	FIL			X						
PEDIASTRUM BORYANUM	COL						X			
RHIZOSOLENIA ERIENSIS	CEL						X			
SCENEDESMUS DIMORPHUS	COL						X			X
SYNEDRA	CEL			X						
TABELLARIA FENESTRATA	CEL	13	24.7	38	13	7.7	43			X
TRACHELOMONAS VOLVOCINA	CEL									X
TOTAL				154			887			111

LAKE NAME: GEORGETOWN RES.
STORET NUMBER: 3004

NYGAARD TROPHIC STATE INDICES

DATE	07 29 75	09 04 75
MYXOPHYCEAN	1.75 E	05/0 E
CHLOROPHYCEAN	2.75 E	04/0 E
EUGLENOPHYTE	0.06 ?	0/09 ?
DIATOM	0.07 ?	0.25 ?
COMPOUND	5.00 E	10/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	07 29 75	09 04 75
GENUS	05	06
SPECIES	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		07 29 75	09 04 75
AVERAGE DIVERSITY	H	2.55	2.04
NUMBER OF TAXA	S	44.00	18.00
NUMBER OF SAMPLES COMPOSITED	M	3.00	3.00
MAXIMUM DIVERSITY	MAXH	5.46	4.17
MINIMUM DIVERSITY	MINH	0.21	0.14
TOTAL DIVERSITY	D	6673.35	3015.12
TOTAL NUMBER OF INDIVIDUALS/ML	N	2617.00	1478.00
EVENNESS COMPONENT	J	0.47	0.49
RELATIVE EVENNESS	RJ	0.45	0.48
MEAN NUMBER OF INDIVIDUALS/TAXA	L	59.48	82.11
NUMBER/ML OF MOST ABUNDANT TAXON	K	732.00	641.00

LAKE NAME: GEORGETOWN RES. CONTINUED
STORET NUMBER: 3004

TAXA	FORM	07 29 75 18	07 29 75 %C	07 29 75 ALGAL UNITS PER ML	09 04 75 18	09 04 75 %C	09 04 75 ALGAL UNITS PER ML
ACHNANTHES MICROCEPHALA	CEL			X			
AMPHIPLEURA PELLUCIDA	CEL			X			
ANABAENA #1	FIL			X			
ANABAENA #2	FIL		1,3	35			
ANABAENA PLANCTONICA	FIL				12	3,9	96
ASTERIONELLA FORMOSA	CEL			X			X
CHROOCOCCUS LIMNETICUS	COL			X			
CHROOMONAS ?	CEL				13	43,4	641
COCCONEIS PLACENTULA V. LINEATA	CEL			X			
COELASTRUM SPHAERICUM	COL			X		1,9	28
COELOSPHAERIUM KUETZINGIANUM	COL			X			
COSMARIUM #1	CEL			X			
COSMARIUM #2	CEL			X			
CRYPTOMONAS EROSA	CEL	13	14,7	384			X
CYCLOTELLA BODANICA	CEL		2,7	70			
CYMBELLA	CEL			X			
DICTIOSPHAERIUM PULCHELLUM	COL			X			
DINOBRION DIVERGENS	CEL			X			
EPITHEMIA SOREX	CEL			X			
EPITHEMIA TURGIDA	CEL			X			
FLAGELLATE #1	CEL	14	14,7	384			
FRAGILARIA	CEL			X			
FRAGILARIA CROTONENSIS	CEL	11	28,0	732	11	36,8	539
GLENODINIUM EDAX	CEL						X
GLOEOCAPSA	COL					1,9	28
GLOEOCYSTIS	COL			X			
GOMPHONEMA	CEL			X			
GONIUM SOCIALE	COL			X			
LAGERHEIMIA	CEL			X			
LYNGBYA	FIL			X			
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL						X
MICROCYSTIS INCERTA	COL			X		3,9	96
MOUGEOTIA	FIL						X
NAVICULA RADIOSA	CEL			X			
NITZSCHIA	CEL			X			
OOCYSTIS	CEL	12	24,0	628			X
OSCILLATORIA	FIL				15	5,7	84
OSCILLATORIA #1	FIL						X
OSCILLATORIA #2	FIL			X			
PEDIASTRUM BORYANUM	COL			X			
PERIDINIUM WILLEI	CEL			X			
QUADRIGULA LACUSTRIS	COL			X			
RHOPALODIA GIBBA	CEL			X			
SCENEDESMUS OPOLIENSIS	COL		2,7	70			
SCENEDESMUS QUADRICAUDA	COL						X
SCENEDESMUS QUADRICAUDA V. QUADRISPINA	COL			X			
SCHROEDERIA SETIGERA	CEL			X			
STAURASTRUM	CEL			X			
STAURASTRUM #2	CEL			X			
SYNEDRA	CEL			X			
SYNEDRA ULNA V. CHASEANA	CEL						X
TABELLARIA FENESTRATA	CEL						X
TETRAEDRON CAUDATUM	CEL			X			
TETRAEDRON MINIMUM	CEL				14	3,9	56
TETRAEDRON MINIMUM V. SCROBICULATUM	CEL	15	13,0	314			
TRACHELOMONAS VOLVOCINA	CEL			X			
TOTAL				2617			1478

LAKE NAME: HEBGEN RES.
STORET NUMBER: 3005

NYGAARD TROPHIC STATE INDICES

DATE	07 30 75	09 03 75	10 20 75
MYXOPHYCEAN	07/0 E	06/0 E	06/0 E
CHLOROPHYCEAN	02/0 E	01/0 E	02/0 E
EUGLENOPHYTE	0/09 ?	0/07 ?	0,12 ?
DIATOM	0,50 E	0,50 E	0,14 ?
COMPOUND	12/0 E	10/0 E	10/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	07 30 75	09 03 75	10 20 75
GENUS	01	00	02
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		07 30 75	09 03 75	10 20 75
AVERAGE DIVERSITY	H	2,47	2,42	2,53
NUMBER OF TAXA	S	20,00	19,00	21,00
NUMBER OF SAMPLES COMPOSITED	M	4,00	4,00	4,00
MAXIMUM DIVERSITY	MAXH	4,32	4,25	4,39
MINIMUM DIVERSITY	MINH	0,34	0,22	0,25
TOTAL DIVERSITY	D	1482,00	2207,04	2279,53
TOTAL NUMBER OF INDIVIDUALS/ML	N	600,00	912,00	901,00
EVENNESS COMPONENT	J	0,57	0,57	0,58
RELATIVE EVENNESS	RJ	0,54	0,55	0,56
MEAN NUMBER OF INDIVIDUALS/TAXA	L	30,00	48,00	42,90
NUMBER/ML OF MOST ABUNDANT TAXON	K	171,00	316,00	428,00

LAKE NAME: HERGEN RES.
STORET NUMBER: 3005

CONTINUED

TAXA	FORM	07 30 75 IS	07 30 75 %C	07 30 75 ALGAL UNITS PER ML	09 03 75 IS	09 03 75 %C	09 03 75 ALGAL UNITS PER ML	10 20 75 IS	10 20 75 %C	10 20 75 ALGAL UNITS PER ML
ANABAENA #1	FIL			X						
ANABAENA #2	FIL	13	14,3	86						
ANABAENA PLANCTONICA	FIL			X	15	3,8	35			
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL			X						
APHANIZOMENON FLOS-AQUAE	FIL	12	14,3	86		3,8	35	14	4,8	43
APHANOTHECE	COL	14	14,3	86						
ASTERIONELLA FORMOSA	CEL			X	12	11,5	105		4,8	43
CAMPYLODISCUS NORICUS V. HIBERNICA	CEL						X			
CHLOPELLA	CEL									X
CHROCOCCUS	COL									X
CHRUOMONAS ?	CEL	15	20,8	171		30,8	281		9,5	86
COCCONEIS PLACENTULA V. LINEATA	CEL			X						
CRYPTOMONAS EROSA	CEL		7,2	43	13	7,7	70			X
CRYPTOMONAS MARSSONII	CEL						X			
CRYPTOMONAS REFLEXA	CEL							13	4,8	43
CYCLOTELLA	CEL			X						
CYMBELLA	CEL									X
EUNOTIA CURVATA ?	CEL								4,8	43
FRAGILARIA CROTONENSIS	CEL	11	21,3	129	11	34,6	316			X
FRAGILARIA LEPTOSTAURON	CEL			X						
GLOEOCAPSA	COL					3,8	35			
GOMPHOSPHAERIA	COL							11	4,8	43
GOMPHOSPHAERIA APONINA	COL			X			X			X
LYNGBYA BIRGEI	FIL						X			
MALLOMONAS ?	CEL									X
MELOSIRA	CEL			X						
MELOSIRA GRANULATA	CEL						X	12	47,5	430
MELOSIRA VARIANS	CEL						X			
MICROCYSTIS	COL							10	9,5	86
MICROCYSTIS INCERTA	COL						X			X
NAVICULA	CEL			X						X
NEIDIUM	CEL						X			
NITZSCHIA ACUMINATA ?	CEL									X
OOCYSTIS	CEL			X						
OSCILLATORIA LIMOSA	FIL			X						
RHOPALODIA GIBBA	CEL						X			
SCHROEDERIA SETIGERA	CEL						X		9,5	86
STEPHANODISCUS	CEL			X	14	3,8	35			
SYNEDRA ULNA	CEL			X			X			X
TRACHELOMONAS	CEL									X
TOTAL				600			913			901

LAKE NAME: KOOCANUSA RES.
STORET NUMBER: 3006

NYGAARD TROPHIC STATE INDICES

DATE	06 02 75	07 24 75	09 05 75
MYXOPHYCEAN	0/0 D	0/0 D	2,00 E
CHLOROPHYCEAN	01/0 E	02/0 E	1,00 E
EUGLENOPHYTE	0/01 ?	0/02 ?	0/03 ?
DIATOM	0,33 E	0,33 E	1,00 E
COMPOUND	02/0 E	03/0 E	5,00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 02 75	07 24 75	09 05 75
GENUS	04	00	00
SPECIES	03	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 02 75	07 24 75	09 05 75
AVERAGE DIVERSITY	H	2,28	1,49	1,75
NUMBER OF TAXA	S	11,00	10,00	11,00
NUMBER OF SAMPLES COMPOSITED	M	5,00	4,00	6,00
MAXIMUM DIVERSITY	MAXH	3,46	3,32	3,46
MINIMUM DIVERSITY	MINH	0,13	0,16	0,38
TOTAL DIVERSITY	D	1928,88	882,08	434,00
TOTAL NUMBER OF INDIVIDUALS/ML	N	846,00	592,00	248,00
EVENNESS COMPONENT	J	0,66	0,45	0,51
RELATIVE EVENNESS	RJ	0,65	0,43	0,45
MEAN NUMBER OF INDIVIDUALS/TAXA	L	76,91	59,20	22,55
NUMBER/ML OF MOST ABUNDANT TAXON	K	339,00	355,00	124,00

LAKE NAME: KOOCANUSA RES.
STORET NUMBER: 3006

CONTINUED

TAXA	FORM	06 02 75 IS	06 02 75 %C	06 02 75 ALGAL UNITS PER ML	07 24 75 IS	07 24 75 %C	07 24 75 ALGAL UNITS PER ML	09 05 75 IS	09 05 75 %C	09 05 75 ALGAL UNITS PER ML
ANABAENA	FIL							3	25.0	63
APHANIZOMENON FLOS-AQUAE	FIL							1	12.5	31
ASTERIONELLA FORMOSA	CEL			X	1	40.0	355	2	12.5	31
BOTRYOCOCCUS BRAUNII	COL						X			
CENTRIC DIATOM	CEL	14	16.0	135						
CERATIUM HIRUNDINELLA	CEL									X
CHROOMONAS ?	CEL	3	40.1	339	3	25.0	148	4	50.0	126
CRYPTOMONAS EROSA	CEL	2	16.0	135	2	5.1	30			X
CRYPTOMONAS MARSSONII	CEL			X	14	10.0	59			
FRAGILARIA CROTONENSIS	CEL						X			X
GOLENKINIA	CEL	1	4.0	34						
NANNAEA ARCUS	CEL			X			X			
MELOSIRA GRANULATA	CEL						X			
MELOSIRA GRANULATA V. ANGUSTISSIMA	CEL									X
MELOSIRA VARIANS	CEL									X
NAVICULA	CEL			X						
NITZSCHIA	CEL	19	8.0	68						
OOCYSTIS	CEL									X
PANDORINA MORUM	COL	1	16.0	135						
PASCHERINA TETRAS	COL			X						
SPHAEROCYSTIS SCHROETERI	COL						X			
STAURASTRUM	CEL									X
SYNEDRA ULNA	CEL						X			
TOTAL				846			592			348

LAKE NAME: MARY ROWAN LAKE
STORET NUMBER: 3007

NYGAARD TROPHIC STATE INDICES

DATE	06 02 75	07 28 75	09 05 75	10 22 75
MYXOPHYCEAN	03/0 E	04/0 E	04/0 E	03/0 E
CHLOROPHYCEAN	01/0 E	04/0 E	04/0 E	05/0 E
EUGLENOPHYTE	0/04 ?	0/08 ?	0/08 ?	0/08 ?
DIATOM	0/07 ?	0/02 ?	0,25 ?	0,40 E
COMPOUND	04/0 E	08/0 E	09/0 E	10/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 02 75	07 28 75	09 05 75	10 22 75
GENUS	01	00	01	02
SPECIES	00	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 02 75	07 28 75	09 05 75	10 22 75
AVERAGE DIVERSITY	H	1,17	2,81	2,45	2,86
NUMBER OF TAXA	S	16,00	14,00	18,00	17,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	3,00	3,00	3,00
MAXIMUM DIVERSITY	MAXH	4,00	3,81	4,17	4,09
MINIMUM DIVERSITY	MINH	0,06	0,16	0,19	0,08
TOTAL DIVERSITY	D	4002,57	2638,59	2508,80	7719,14
TOTAL NUMBER OF INDIVIDUALS/ML	N	3421,00	939,00	1024,00	2699,00
EVENNESS COMPONENT	J	0,29	0,74	0,59	0,70
RELATIVE EVENNESS	RJ	0,29	0,73	0,57	0,70
MEAN NUMBER OF INDIVIDUALS/TAXA	L	213,81	67,07	56,89	158,76
NUMBER/ML OF MOST ABUNDANT TAXON	K	2787,00	245,00	373,00	851,00

LAKE NAME: MARY ROHAN LAKE
STORET NUMBER: 3007

CONTINUED

TAXA	FORM	06 03 75			07 28 75			09 05 75			10 23 75		
		IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML
ANABAENA	FIL			X							14	4,3	117
ANABAENA #1	FIL				1	4,4	41						
ANABAENA #2	FIL				1	4,4	41						
ANABAENA FLOS-AQUAE	FIL							11	15,1	155			
ANKISTRODESMUS	CEL	1	0,9	32							1	1,1	29
ANKISTRODESMUS FALCATUS	CEL				1	4,4	41						
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL									X			
APHANIZOMENON FLOS-AQUAE	FIL	13	3,0	95	11	26,1	245	12	9,1	93	11	31,5	851
APHANOTHECE	COL				15	4,4	41	13	21,2	217			
CERATIUM HIRUNDINELLA	CEL				12	4,4	41			X			
CHROOCOCCUS LIMNETICUS ?	COL									X			
CHROOMONAS ?	CEL				1	17,4	163	14	36,4	373	15	9,8	264
CRUCIGENIA RECTANGULARIS	COL				13	17,4	163						
CRYPTOMONAS EROSA	CEL			X				15	9,1	93	12	25,0	675
CRYPTOMONAS MARSSONII	CEL			X	14	17,4	163	1	6,1	62			
CRYPTOMONAS SPP.	CEL	13	5,6	190									
CYMBELLA	CEL			X									X
CYMBELLA CISTULA	CEL									X			
DINOBRYON DIVERGENS	CEL	11	81,5	2787									
EPITHEMIA	CEL						X						
FRAGILARIA	CEL									X			
FRAGILARIA #2	CEL			X							1	2,2	59
FRAGILARIA CROTONENSIS	CEL	1	3,8	95			X			X	1	4,3	117
GLOEOCYSTIS	COL						X						
GYROSIGMA	CEL			X									
HALLOMONAS	CEL	15	1,9	63									
HALLOMONAS ACAROIDES	CEL								3,0	31			
MELOSIRA	CEL										1	4,3	117
MICROCYSTIS INCERTA	COL	14	3,7	127							13	10,9	294
NAVICULA	CEL	1	0,9	32									
NAVICULA ?	CEL									X			
OOCYSTIS	CEL						X				1	1,1	29
OPEPHORA MARTYI	CEL			X									
PEDIASTRUM BORYANUM	COL						X				1	1,1	29
PEDIASTRUM DUPLEX V. RETICULATUM	COL									X			
QUADRIGULA	COL									X			
SCENEDESMUS BRASILIENSIS V. NORVEGICUS	COL												X
SCHROEDERIA SETIGERA	CEL									X	1	2,2	59
STEPHANODISCUS	CEL									X	1	2,2	59
SYNEDRA ACUS	CEL												X
SYNEDRA ULNA	CEL			X									
TABELLARIA FENESTRATA	CEL												X
TOTAL				3421			939			1024			2699

LAKE NAME: MCDONALD LAKE
STORET NUMBER: 3008

NYGAARD TROPHIC STATE INDICES

DATE	06 01 75	07 28 75
MYXOPHYCEAN	0/0 O	01/0 E
CHLOROPHYCEAN	0/0 O	01/0 E
EUGLENOPHYTE	0/0 ?	0/02 ?
DIATOM	0,12 ?	1,00 E
COMPOUND	01/0 E	03/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 01 75	07 28 75
GENUS	00	01
SPECIES	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 01 75	07 28 75
AVERAGE DIVERSITY	H	0,74	0,01
NUMBER OF TAXA	S	14,00	5,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	3,00
MAXIMUM DIVERSITY	MAXH	3,81	2,32
MINIMUM DIVERSITY	MINH	1,37	0,50
TOTAL DIVERSITY	D	51,80	0,57
TOTAL NUMBER OF INDIVIDUALS/ML	N	70,00	57,00
EVENNESS COMPONENT	J	0,19	0,00
RELATIVE EVENNESS	RJ	-0,25	-0,26
MEAN NUMBER OF INDIVIDUALS/TAXA	L	5,00	11,40
NUMBER/ML OF MOST ABUNDANT TAXON	K	56,00	57,00

LAKE NAME: MCDONALD LAKE CONTINUED
STORET NUMBER: 3008

TAXA	FORM	06 01 75			07 28 75		
		1B	%C	ALGAL UNITS PER ML	1B	%C	ALGAL UNITS PER ML
ACHNANTHES FLEXELLA	CEL			X			
ANABAENA	FIL						X
ASTERIONELLA FORMOSA	CEL			X			X
COCCONEIS PLACENTULA V. LINEATA	CEL			X			
CYCLOTELLA OCELLATA	CEL				1	100.0	57
CYMATOPLEURA SOLEA V. APICULATA	CEL			X			
DINOBRYON CILINDRICUM	CEL			X			X
DINOBRYON DIVERGENS	CEL	1	100.0	56			
FRAGILARIA CROTONENSIS	CEL			X			
GYMNODINIUM ORDINATUM	CEL	2	20.0	14			
MELOSIRA ITALICA	CEL			X			
NAVICULA	CEL			X			
OOCYSTIS	CEL						X
PERIDINIUM INCONSPICUUM	CEL			X			
PERIDINIUM WILLEI	CEL			X			
SYNEDRA CYCLOPUM	CEL			X			
SYNEDRA ULNA	CEL			X			
TOTAL				70			57

LAKE NAME: NELSON RES.
STORET NUMBER: 3009

NYGAARD TROPHIC STATE INDICES

DATE	05 30 75	07 24 75	09 08 75
MYXOPHYCEAN	01/0 E	04/0 E	02/0 E
CHLOROPHYCEAN	06/0 E	03/0 E	02/0 E
EUGLENOPHYTE	0/07 ?	0/07 ?	0/04 ?
DIATOM	0,50 E	0,29 ?	0,50 E
COMPOUND	08/0 E	09/0 E	05/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 30 75	07 24 75	09 08 75
GENUS	00	02	05
SPECIES	00	03	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 30 75	07 24 75	09 08 75
AVERAGE DIVERSITY	H	1,86	1,29	0,91
NUMBER OF TAXA	S	13,00	19,00	12,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	3,00	3,00
MAXIMUM DIVERSITY	MAXH	3,70	4,25	3,58
MINIMUM DIVERSITY	MINH	0,17	0,19	0,03
TOTAL DIVERSITY	D	1452,66	1398,36	4041,31
TOTAL NUMBER OF INDIVIDUALS/ML	N	781,00	1084,00	4441,00
EVENNESS COMPONENT	J	0,50	0,30	0,25
RELATIVE EVENNESS	RJ	0,48	0,28	0,25
MEAN NUMBER OF INDIVIDUALS/TAXA	L	60,08	57,05	370,08
NUMBER/ML OF MOST ABUNDANT TAXON	K	347,00	523,00	3800,00

LAKE NAME: NELSON RES. CONTINUED
STORET NUMBER: 3009

TAXA	FORM	05 30 75 IS	05 30 75 %C	05 30 75 ALGAL UNITS PER ML	07 24 75 IS	07 24 75 %C	07 24 75 ALGAL UNITS PER ML	09 08 75 IS	09 08 75 %C	09 08 75 ALGAL UNITS PER ML
ACTINASTRUM	CEL			X			X			
ANABAENA	FIL									
ANKISTRODESMUS FALCATUS	CEL	14	8,8	43	13	6,9	75			
APHANIZOMENON FLOS-AQUAE	FIL				11	44,8	486	11	85,4	3800
BOTRYOCOCCUS BRAUNII	COL						X			
CENTRIC DIATOM	CEL	13	33,4	261			X			
CHLORUPHYTAN COCCOID CELLED COLONY	COL									X
CHROOMONAS ?	CEL	12	44,4	347	12	48,3	523	15	3,9	171
COCCONEIS	CEL						X			
COELASTRUM MICROPORUM	COL			X						
CRYPTOMONAS EROSA	CEL						X			X
CRYPTOMONAS MARSSONII	CEL	11	11,1	87				1	1,0	43
CYMBELLA MINUTA V. SILESIACA	CEL						X			
EPITHEMIA	CEL						X			
FLAGELLATE #2	CEL							13	4,3	192
FRAGILARIA	CEL						X			
GYROSIGMA	CEL						X			X
MELOSIRA ITALICA	CEL						X			
MICROCYSTIS AERUGINOSA	COL						X			
NAVICULA RHYNCHOCEPHALA V. GERMAINII	CEL						X			
NITZSCHIA ACICULARIS	CEL	15	8,9	43						
NITZSCHIA LONGISSIMA V. REVERSA	CEL									X
NITZSCHIA VERMICULARIS	CEL			X			X			
OEDOGONIUM	FIL						X			
OSCILLATORIA	FIL						X	12	2,9	128
OSCILLATORIA #1	FIL			X						
PASCHERINA TETRAS	COL			X						
SCENEDESMUS ACUMINATUS	COL			X						
SCENEDESMUS DIMORPHUS	COL									X
SCHROEDERIA SETIGERA	CEL			X			X	14	3,4	107
STEPHANODISCUS NIAGARAE	CEL									X
TETRASTRUM STAUROGENIAEFORME	COL			X						
TOTAL				781			1084			4441

LAKE NAME: SEELEY LAKE
STORET NUMBER: 3010

NYGAARD TROPHIC STATE INDICES

DATE	05 28 75	07 29 75	09 04 75
MYXOPHYCEAN	04/0 E	02/0 E	02/0 E
CHLOROPHYCEAN	01/0 E	02/0 E	01/0 E
EUGLENOPHYTE	0/05 ?	0.25 E	0/03 ?
DIATON	0.12 ?	0.38 E	1.00 E
COMPOUND	06/0 E	10/0 E	05/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 28 75	07 29 75	09 04 75
GENUS	01	01	02
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 28 75	07 29 75	09 04 75
AVERAGE DIVERSITY	H	2.14	2.50	2.96
NUMBER OF TAXA	S	19.00	28.00	16.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	3.00
MAXIMUM DIVERSITY	MAXH	4.25	4.81	4.00
MINIMUM DIVERSITY	MINH	0.13	0.30	0.12
TOTAL DIVERSITY	D	3642.28	2557.50	4522.88
TOTAL NUMBER OF INDIVIDUALS/ML	N	1702.00	1023.00	1528.00
EVENNESS COMPONENT	J	0.50	0.52	0.74
RELATIVE EVENNESS	RJ	0.49	0.49	0.74
MEAN NUMBER OF INDIVIDUALS/TAXA	L	89.58	36.54	95.50
NUMBER/ML OF MOST ABUNDANT TAXON	K	826.00	341.00	425.00

LAKE NAME: SEELEY LAKE
STORET NUMBER: 3010

CONTINUED

TAXA	FORM	05 20 75			07 29 75			09 04 75		
		IS	%C	ALGAL UNITS PER ML	IS	%C	ALGAL UNITS PER ML	IS	%C	ALGAL UNITS PER ML
ACHNANTHES LANCEOLATA V. ROSTRATA	CEL						X			
ANABAENA PLANCTONICA	FIL	4	1.4	24			X	5	5.6	85
ANKISTRODESMUS FALCATUS	CEL						X			
ASTERIONELLA FORMOSA	CEL		1.4	24		2.5	26			X
CHROOMONAS ?	CEL				2	33.3	341			
COCCONEIS	CEL						X			
CRYPTOMONAS	CEL	3	8.3	142		2.5	26	4	11.1	170
CYANOPHYTAN FILAMENT	FIL			X						
CYCLOTELLA CONTA	CEL						X			
DACTYLOCOCCOPSIS	CEL			X						
DINOBRYON CYLINDRICUM	CEL			X						X
DINOBRYON DIVERGENS	CEL			X	1	10.3	105			X
DINOBRYON SPP.	CEL	11	40.5	826				3	27.8	425
EPITHEMIA TURGIDA	CEL						X			
EUDORINA ELEGANS	COL						X			
FLAGELLATE #2	CEL		8.3	142					11.1	170
FRAGILARIA #2	CEL			X						
FRAGILARIA CONSTRUENS	CEL				3	20.5	210			
FRAGILARIA CROTONENSIS	CEL	5	4.2	71	5	7.7	79	1	19.4	297
GOMPHONEMA ANGUSTATUM	CEL		1.4	24						
GONPHOSPHAENIA	COL						X			
GYMNODINIUM	CEL								2.7	42
LUNATE CELL	CEL								2.7	42
MELOSIRA #1	CEL						X			
MELOSIRA DISTANS	CEL						X			
MELOSIRA ITALICA	CEL	2	25.0	425					5.6	85
MELOSIRA SPP.	CEL				1	20.5	210			
MELOSIRA VARIANS	CEL						X			
MERIDION CIRCULARE	CEL						X			
MICROCYSTIS INCERTA	COL			X				2	9.3	137
MOUGEOTIA	FIL									X
NAVICULA	CEL						X			
NAVICULA #1	CEL			X						
NAVICULA #2	CEL			X						
NEIDIUM IRIDIS	CEL						X			
NITZSCHIA	CEL		1.4	24						
OOCYSTIS	CEL						X			
PERIDINIUM INCONSPICUUM	CEL									X
PINNULARIA	CEL						X			
SCHROEDERIA SETIGERA	CEL			X					5.6	85
STEPHANODISCUS	CEL									X
STEPHANODISCUS NIAGARAE	CEL						X			
SURIRELLA BISERIATA	CEL						X			
SYNEDRA ULNA	CEL						X			
TABELLARIA FENESTRATA	CEL			X		2.5	26			
TRACHELOMONAS VOLVOCINA	CEL						X			
TOTAL				1702			1023			1520

LAKE NAME: SWAN LAKE
STORET NUMBER: 3011

NYGAARD TROPHIC STATE INDICES

DATE	06 02 75	07 28 75	09 05 75
MYXOPHYCEAN	0/0 D	0/0 D	0/0 D
CHLOROPHYCEAN	01/0 E	0/0 D	0/0 D
EUGLENOPHYTE	0/01 ?	0/0 ?	0/0 ?
DIATOM	0,14 ?	0,50 E	0,33 E
COMPOUND	02/0 E	02/0 E	01/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 02 75	07 28 75	09 05 75
GENUS	00	00	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 02 75	07 28 75	09 05 75
AVERAGE DIVERSITY	H	1,89	1,00	1,76
NUMBER OF TAXA	S	15,00	8,00	6,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	3,00	3,00
MAXIMUM DIVERSITY	MAXH	3,91	3,00	2,58
MINIMUM DIVERSITY	MINH	0,18	0,13	0,10
TOTAL DIVERSITY	D	1612,17	580,00	910,48
TOTAL NUMBER OF INDIVIDUALS/ML	N	853,00	580,00	516,00
EVENNESS COMPONENT	J	0,49	0,33	0,69
RELATIVE EVENNESS	RJ	0,46	0,31	0,68
MEAN NUMBER OF INDIVIDUALS/TAXA	L	56,87	72,50	86,00
NUMBER/ML OF MOST ABUNDANT TAXON	K	545,00	290,00	238,00

LAKE NAME: SWAN LAKE
STORET NUMBER: 3011

CONTINUED

TAXA	FORM	06 02 78			07 28 78			09 05 78		
		ID	%C	ALGAL UNITS PER ML	ID	%C	ALGAL UNITS PER ML	ID	%C	ALGAL UNITS PER ML
ACHNANTHES MICROCEPHALA	CEL		2,0	24						
ASTERIONELLA FORMOSA	CEL	13	5,5	47	11	50,0	290	12	23,1	119
CHROOMONAS ?	CEL				12	50,0	290	13	46,1	238
CRYPTOMONAS EROSA	CEL	12	5,5	47				11	23,1	119
CYCLOTELLA KUTZINGIANA	CEL						X	14	7,8	40
CYMBELLA	CEL						X			
DINOBRYON BAVARICUM	CEL			X						
DINOBRYON DIVERGENS	CEL			X						
DINOBRYON SOCIALE	CEL						X			
DINOBRYON SPP.	CEL	11	63,9	545						
FRAGILARIA 82	CEL			X						
FRAGILARIA CROTONENSIS	CEL			X			X			X
FRAGILARIA LEPTOSTAURON	CEL						X			
GYMNODINIUM ALBULUM	CEL	14	11,1	95						
GYROSIGMA	CEL									X
MALLOMONAS	CEL	4	2,0	24						
MELOSIRA	CEL						X			
MELOSIRA ITALICA	CEL	15	5,5	47						
PENNATE DIATOM	CEL			X						
SCHROEDERIA SETIGERA	CEL		2,0	24						
SYNEDRA ULNA	CEL			X						
TABELLARIA FENESTRATA	CEL			X						
TOTAL				853			580			516

LAKE NAME: TALLY LAKE
STORET NUMBER: 3012

NYGAARD TROPHIC STATE INDICES

DATE	06 02 75	07 28 75	09 05 75
MYXOPHYCEAN	1.00 E	02/0 E	03/0 E
CHLOROPHYCEAN	1.00 E	0/0 O	01/0 E
EUGLENOPHYTE	0/02 ?	0/02 ?	0/04 ?
DIATOM	0.50 E	0.33 E	2.00 E
COMPOUND	4.00 E	03/0 E	06/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 02 75	07 28 75	09 05 75
GENUS	02	00	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 02 75	07 28 75	09 05 75
AVERAGE DIVERSITY	H	2.67	0.81	1.78
NUMBER OF TAXA	S	15.00	8.00	10.00
NUMBER OF SAMPLES COMPOSITED	M	2.00	2.00	2.00
MAXIMUM DIVERSITY	MAXH	3.91	3.00	3.32
MINIMUM DIVERSITY	MINH	0.12	0.42	0.06
TOTAL DIVERSITY	D	3783.39	114.21	3465.66
TOTAL NUMBER OF INDIVIDUALS/ML	N	1417.00	141.00	1947.00
EVENNESS COMPONENT	J	0.68	0.27	0.54
RELATIVE EVENNESS	RJ	0.68	0.16	0.53
MEAN NUMBER OF INDIVIDUALS/TAXA	L	94.47	17.63	194.70
NUMBER/ML OF MOST ABUNDANT TAXON	K	322.00	106.00	1107.00

LAKE NAME: TALLY LAKE
STORET NUMBER: 3012

CONTINUED

TAXA	FORM	04 02 75 IB	04 02 75 %C	04 02 75 ALGAL UNITS PER ML	07 28 75 IB	07 28 75 %C	07 28 75 ALGAL UNITS PER ML	09 05 75 IB	09 05 75 %C	09 05 75 ALGAL UNITS PER ML
ANKISTRODESMUS FALCATUS	CEL							2	2,0	39
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL			X						
ASTERIONELLA FORMOSA	CEL	13	15,9	226			X			
CENTRIC DIATOM	CEL						X	13	7,9	153
CERATIUM HIRUNDINELLA F. FURCOIDES	CEL			X						
CHROOCOCCUS	COL						X			X
CHROOMONAS ?	CEL	2	2,3	32	11	75,2	106	15	9,8	191
COELOSPHAERIUM	COL									X
COSMARIUM	CEL			X						
CRYPTOMONAS EROSA	CEL	4	4,5	64			X	14	2,0	39
DINOBRYON CYLINDRICUM	CEL	11	22,7	322						
DINOBRYON DIVERGENS	CEL							23	21,6	420
EPITHEMIA	CEL			X						
EUDORINA ELEGANS	COL			X						
FLAGELLATE	CEL	15	18,2	259						
FRAGILARIA CROTONENSIS	CEL			X			X	11	56,9	1107
MELOSIRA DISTANS	CEL									X
MELOSIRA VARIANS	CEL			X						
OSCILLATORIA LIMNETICA	FIL	2	2,3	32	12	24,8	35			X
STEPHANODISCUS	CEL	14	13,6	193						
SYNEDRA ACUS	CEL	12	20,5	290						
SYNEDRA DELICATISSIMA V. ANGUSTISSIMA	CEL						X			
TOTAL				1417			141			1947

LAKE NAME: TIBER RES
STORET NUMBER: 3013

NYGAARD TROPHIC STATE INDICES

DATE	05 30 75	07 25 75
MYXOPHYCEAN	01/0 E	03/0 E
CHLOROPHYCEAN	05/0 E	02/0 E
EUGLENOPHYTE	0,33 E	0,20 ?
DIATOM	0/07 ?	0/09 ?
COMPOUND	08/0 E	06/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 30 75	07 25 75
GENUS	04	03
SPECIES	03	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 30 75	07 25 75
AVERAGE DIVERSITY	H	1,88	1,70
NUMBER OF TAXA	S	20,00	19,00
NUMBER OF SAMPLES COMPOSITED	N	6,00	6,00
MAXIMUM DIVERSITY	MAXH	4,32	4,25
MINIMUM DIVERSITY	MINH	0,27	0,10
TOTAL DIVERSITY	D	1457,00	3665,20
TOTAL NUMBER OF INDIVIDUALS/ML	N	775,00	2156,00
EVENNESS COMPONENT	J	0,44	0,40
RELATIVE EVENNESS	RJ	0,40	0,39
MEAN NUMBER OF INDIVIDUALS/TAXA	L	38,75	113,47
NUMBER/ML OF MOST ABUNDANT TAXON	K	417,00	1390,00

LAKE NAME: TIBER RES
STORET NUMBER: 3013

CONTINUED

TAXA	FORM	05 30 75				07 25 75			
		1S	%C	ALGAL UNITS PER ML		1S	%C	ALGAL UNITS PER ML	
ACTINASTRUM GRACILIMUM	CEL			X					
	FIL							X	
ANABAENA									
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL	12	23,1	179					
APHANIZOMENON FLOS-AQUAE	FIL							X	
ASTERIONELLA FORMOSA	CEL							X	
ASTERIONELLA FORMOSA V. GRACILLIMA	CEL			X					
CHROOMONAS ?	CEL	11	53,8	417		13	6,4	139	
CHRYSOPHYTAN COCCOID CELL	CEL	15	3,9	30					
CRYPTOMONAS	CEL					14	3,2	70	
CRYPTOMONAS EROSA	CEL	14	3,9	30					
CRYPTOMONAS MARSSONII	CEL							X	
CYANOPHYTAN FILAMENT	FIL			X					
CYMBELLA	CEL			X					
CYST	CEL			X					
EUGLENA	CEL						1,6	35	
FRAGILARIA	CEL					12	16,1	348	
GOMPHONEMA OLIVACEUM	CEL							X	
GYROSIGMA	CEL			X					
HANNAEA ARCUS	CEL			X					
NAVICULA	CEL			X					
NAVICULA #1	CEL							X	
NAVICULA #2	CEL						1,6	35	
NITZSCHIA	CEL			X					
NITZSCHIA #1	CEL							X	
NITZSCHIA #2	CEL							X	
NITZSCHIA LONGISSIMA V. REVERSA	CEL							X	
NITZSCHIA SPP.	CEL					11	64,5	1390	
PEDIASTRUM BORYANUM	COL			X					
PHORMIDIUM	FIL							X	
SCENEDESMUS DIMORPHUS	COL			X					
SCHROEDERIA SETIGERA	CEL					15	6,4	139	
SPHAEROCYSTIS SCHROETERI	COL							X	
SURIRELLA	CEL			X					
SYNEDRA ACUS	CEL	13	11,5	89					
SYNEDRA ULNA	CEL							X	
TETRASTRUM GLABRUM	COL			X					
TRACHELOMONAS DUBIA	CEL			X					
TRACHELOMONAS GIRARDIANA	CEL		3,9	30					
TOTAL				775				2156	

LAKE NAME: TONGUE RIVER RES.
STORET NUMBER: 3014

NYGAARD TROPHIC STATE INDICES

DATE	05 23 75	08 29 75	10 15 75
MYXOPHYCEAN	0/0 D	2,00 E	2,00 E
CHLOROPHYCEAN	01/0 E	2,00 E	3,00 E
EUGLENOPHYTE	1,00 E	0,75 E	0,20 ?
DIATOM	1,00 E	0,50 E	0,17 ?
COMPOUND	03/0 E	9,00 E	8,00 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	05 23 75	08 29 75	10 15 75
GENUS	05	05	09
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		05 23 75	08 29 75	10 15 75
AVERAGE DIVERSITY	H	1,90	2,91	2,70
NUMBER OF TAXA	S	8,00	18,00	25,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	4,00	3,00
MAXIMUM DIVERSITY	MAXH	3,00	4,17	4,64
MINIMUM DIVERSITY	MINH	0,04	0,05	0,12
TOTAL DIVERSITY	D	4396,60	12550,83	6701,40
TOTAL NUMBER OF INDIVIDUALS/ML	N	2314,00	4313,00	2482,00
EVENNESS COMPONENT	J	0,63	0,70	0,58
RELATIVE EVENNESS	RJ	0,63	0,70	0,58
MEAN NUMBER OF INDIVIDUALS/TAXA	L	289,25	239,61	99,28
NUMBER/ML OF MOST ABUNDANT TAXON	K	1106,00	946,00	670,00

LAKE NAME: TONGUE RIVER RES, STORET NUMBER: 3014

CONTINUED

TAXA	FORM	05 23 75			08 29 75			10 15 75		
		IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML
ANKISTRODESMUS FALCATUS V. ACICULARIS	CEL	1	1,8	34						
APHANIZOMENON FLOS-AQUAE	FIL				31	6,1	265			X
ASTERIONELLA FORMOSA	CEL				1	0,0	378			X
CELL	CEL	1	3,9	67						
CHROOMONAS ?	CEL				15	20,2	870	14	7,9	197
CLOSTERIUM	CEL									X
COCCONEIS	CEL						X			
CRYPTOMONAS	CEL				14	6,1	265			
CRYPTOMONAS EROSA	CEL									X
CRYPTOMONAS EROSA V. REFLEXA	CEL						X			
CRYPTOMONAS MARSSONII	CEL	14	11,6	268						X
CRYPTOMONAS SPP.	CEL							12	23,6	591
CYANOPHYTAN FILAMENT	FIL									X
CYCLOTELLA	CEL						X			
DIATOMA VULGARE	CEL									X
DINOBRYON SOCIALE V. AMERICANUM	CEL	1	1,8	34						
ELAKATOTHRIX	CEL				1	1,0	76			
EPITHEMIA SOREX	CEL									X
EUGLENA	CEL	11	47,8	1106				1	3,2	79
EUGLENA SPP.	CEL				12	21,9	946			
FRAGILARIA CROTONENSIS	CEL				1	2,6	113	13	23,2	552
FRAGILARIA LEPTOSTAURON	CEL									X
GLENODINIUM	CEL	1	1,8	34						
GLENODINIUM GYMNODINIUM V. BISCUTELLIFORME	CEL				11	21,1	908			
NANTESCHIA	CEL							1	4,0	118
MELOSIRA	CEL							1	3,2	79
MICROCYSTIS	COL						X			
NAVICULA	CEL							1	4,0	118
NAVICULA #2	CEL									X
NITZSCHIA FILIFORMIS	CEL									X
NITZSCHIA LONGISSIMA V. REVERSA	CEL							1	1,6	39
PEDIASTRUM DUPLEX	COL							1	1,6	39
SCHROEDERIA SETIGERA	CEL						X			X
SPHAEROCYSTIS SCHROETERI	COL									X
STAURASTRUM	CEL						X			
STEPHANODISCUS	CEL	12	31,6	737	1	0,9	38	11	27,0	670
STIPITOCOCCUS	CEL				1	9,6	416			
SURIRELLA OVATA	CEL						X			X
SYNEDRA ULNA	CEL	1	1,5	34						X
TRACHELOMONAS ENSIFERA V. JAVANICA ?	CEL				1	0,9	38	1		
TOTAL				2314			4313			2492

LAKE NAME: WHITEFISH LAKE
STORET NUMBER: 3016

NYGAARD TROPHIC STATE INDICES

DATE	06 02 75	07 28 75	09 05 75
MYXOPHYCEAN	0/0 D	0/0 D	01/0 E
CHLOROPHYCEAN	0/0 D	01/0 E	02/0 E
EUGLENOPHYTE	0/0 ?	0/01 ?	0/03 ?
DIATOM	0,17 ?	0,14 ?	0/01 ?
COMPOUND	02/0 E	02/0 E	03/0 E

PALMER'S ORGANIC POLLUTION INDICES

DATE	06 02 75	07 28 75	09 05 75
GENUS	02	04	00
SPECIES	00	00	00

SPECIES DIVERSITY AND ABUNDANCE INDICES

DATE		06 02 75	07 28 75	09 05 75
AVERAGE DIVERSITY	H	2,14	2,42	1,20
NUMBER OF TAXA	S	16,00	13,00	6,00
NUMBER OF SAMPLES COMPOSITED	M	3,00	3,00	3,00
MAXIMUM DIVERSITY	MAXH	4,00	3,70	2,58
MINIMUM DIVERSITY	MINH	0,22	0,10	0,11
TOTAL DIVERSITY	D	1568,62	3467,86	586,80
TOTAL NUMBER OF INDIVIDUALS/ML	N	733,00	1433,00	489,00
EVENNESS COMPONENT	J	0,54	0,65	0,47
RELATIVE EVENNESS	RJ	0,51	0,65	0,45
MEAN NUMBER OF INDIVIDUALS/TAXA	L	45,81	110,23	81,50
NUMBER/ML OF MOST ABUNDANT TAXON	K	259,00	524,00	314,00

LAKE NAME: WHITEFISH LAKE
STORET NUMBER: 3016

CONTINUED

TAXA	FORM	06 02 75			07 28 75			09 05 75		
		IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML	IB	%C	ALGAL UNITS PER ML
ASTERIONELLA FORMOSA	CEL	14	11,7	86	14	7,3	105			X
CAMPYLODISCUS NORICUS V. HIBERNICA	CEL			X						
CHROOCOCCUS LIMNETICUS	COL									X
CHRODMONAS ?	CEL	15	11,7	86						
CRYPTOMONAS	CEL				13	4,9	70			
CRYPTOMONAS EROSA	CEL									X
CYCLOTELLA	CEL					2,4	35			
CYMBELLA PROSTRATA	CEL						X			
CYMBELLA TRIANGULUM	CEL			X						
DINOBRYON DIVERGENS	CEL			X	11	34,1	489	11	64,2	314
DIPLONEIS FINNICA	CEL			X						
FRAGILARIA 02	CEL						X			
FRAGILARIA CROTONENSIS	CEL	11	35,3	259	12	36,6	524			
GYMNODINIUM	CEL					2,4	35			
GYMNODINIUM ALPULUM	CEL					2,4	35			
GYROSIGMA	CEL			X						
HANTZSCHIA	CEL					2,4	35			
MELOSIRA	CEL			X						
PINNULARIA	CEL			X						
SCENEDESMUS BIJUGA	COL				15	4,9	70			
SCHROEDERIA SETIGERA	CEL							3	7,2	35
SPHAEROCYSTIS ? SCHROETERI	CEL							2	28,6	140
STEPHANODISCUS	CEL	13	11,7	86						
SURIRELLA	CEL			X			X			
SYNEDRA ACUS	CEL	12	29,5	216						
SYNEDRA ULNA	CEL			X						
SYNEDRA ULNA V. CHAEANA	CEL			X						
TABELLARIA FENESTRATA	CEL			X		2,4	35			
TOTAL				733			1433			489